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(54) **Fencing system**

(57) In erecting a fence, a support socket 10 having lateral fins is forced into the ground in a depression 11 using a hydraulic hammer fitted with a special locating tool. A fence post 12 is inserted in the socket 10 and a concrete collar is cast into the depression 11. Glass reinforced cement panels 16 are bolted to horizontal members 14 connected between adjacent posts 12, 12a. The panels 16 are of a width which can bridge the posts 15 to provide an unbroken fence line.

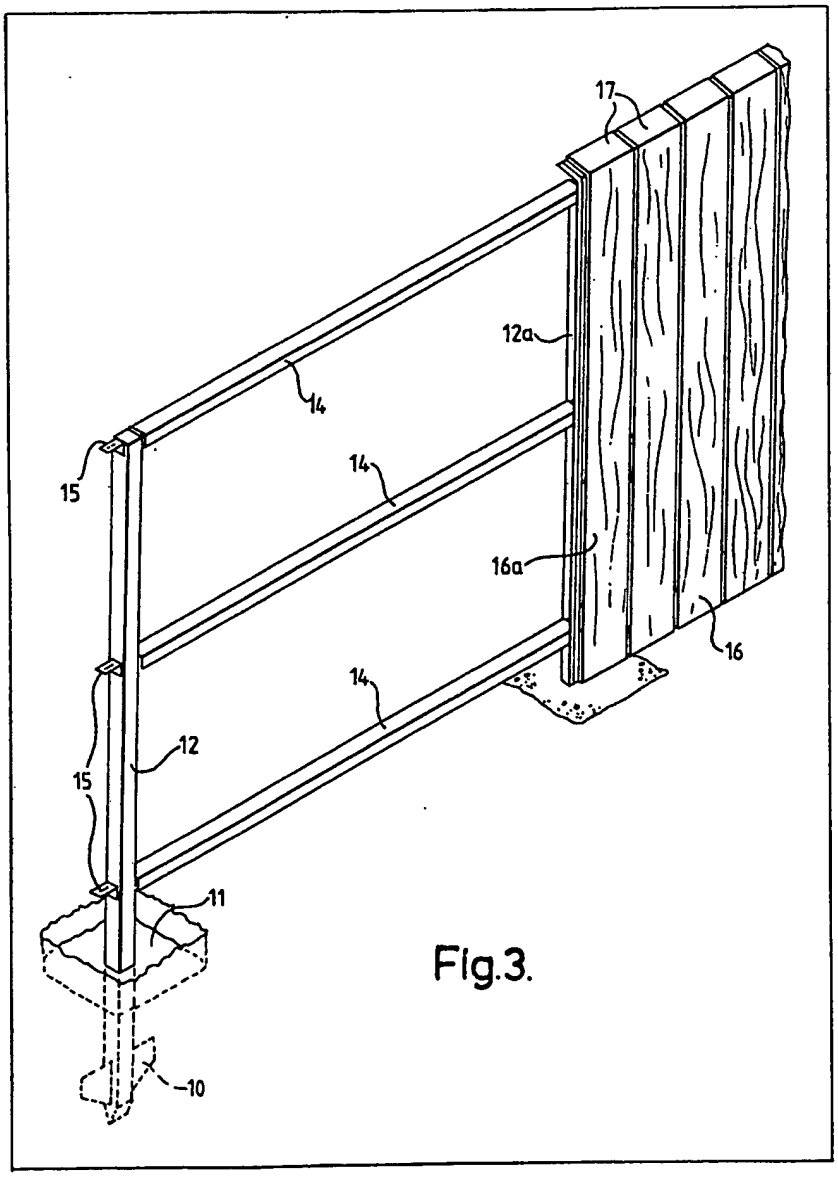

Fig.3.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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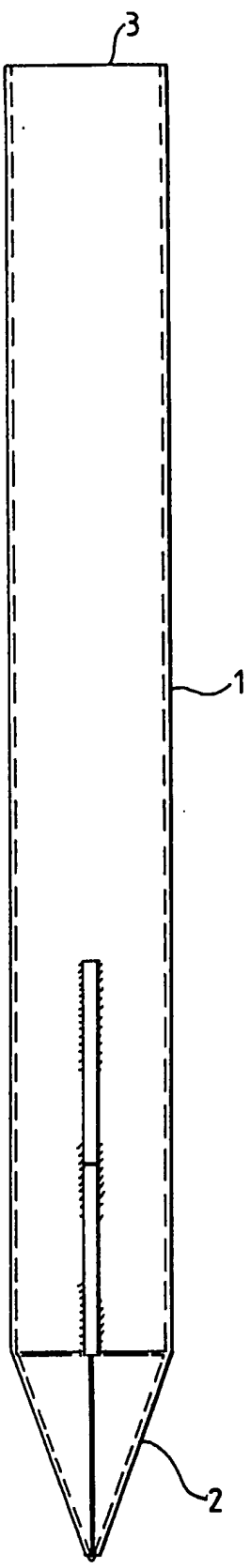
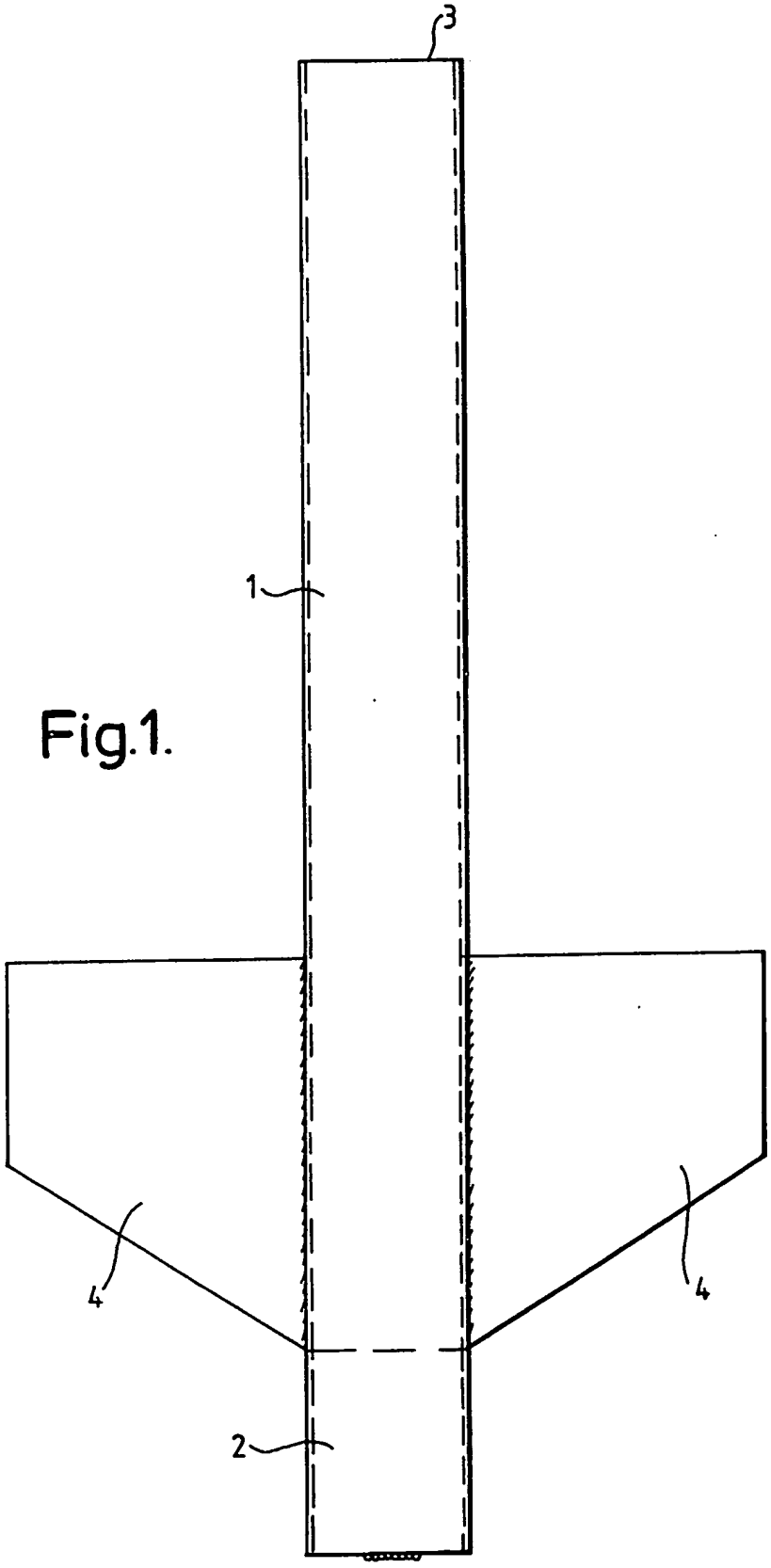


Fig.1.



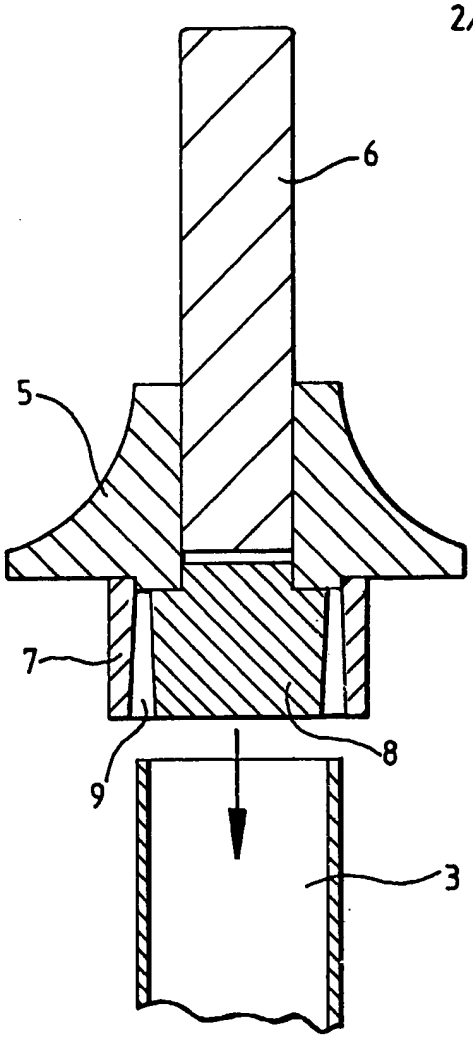


Fig.2.

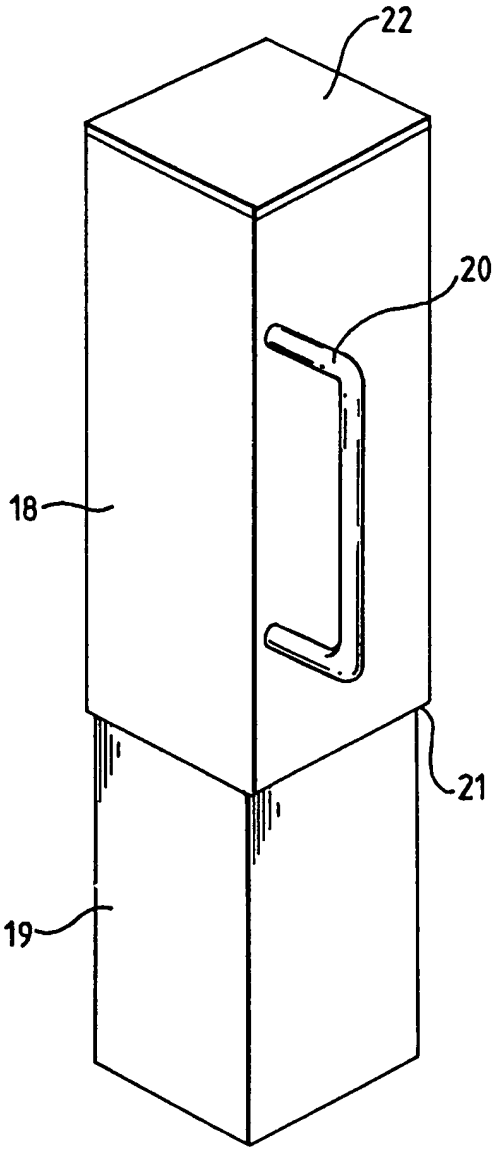


Fig.5.

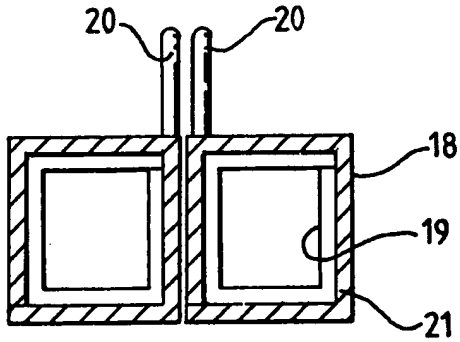


Fig.5a.

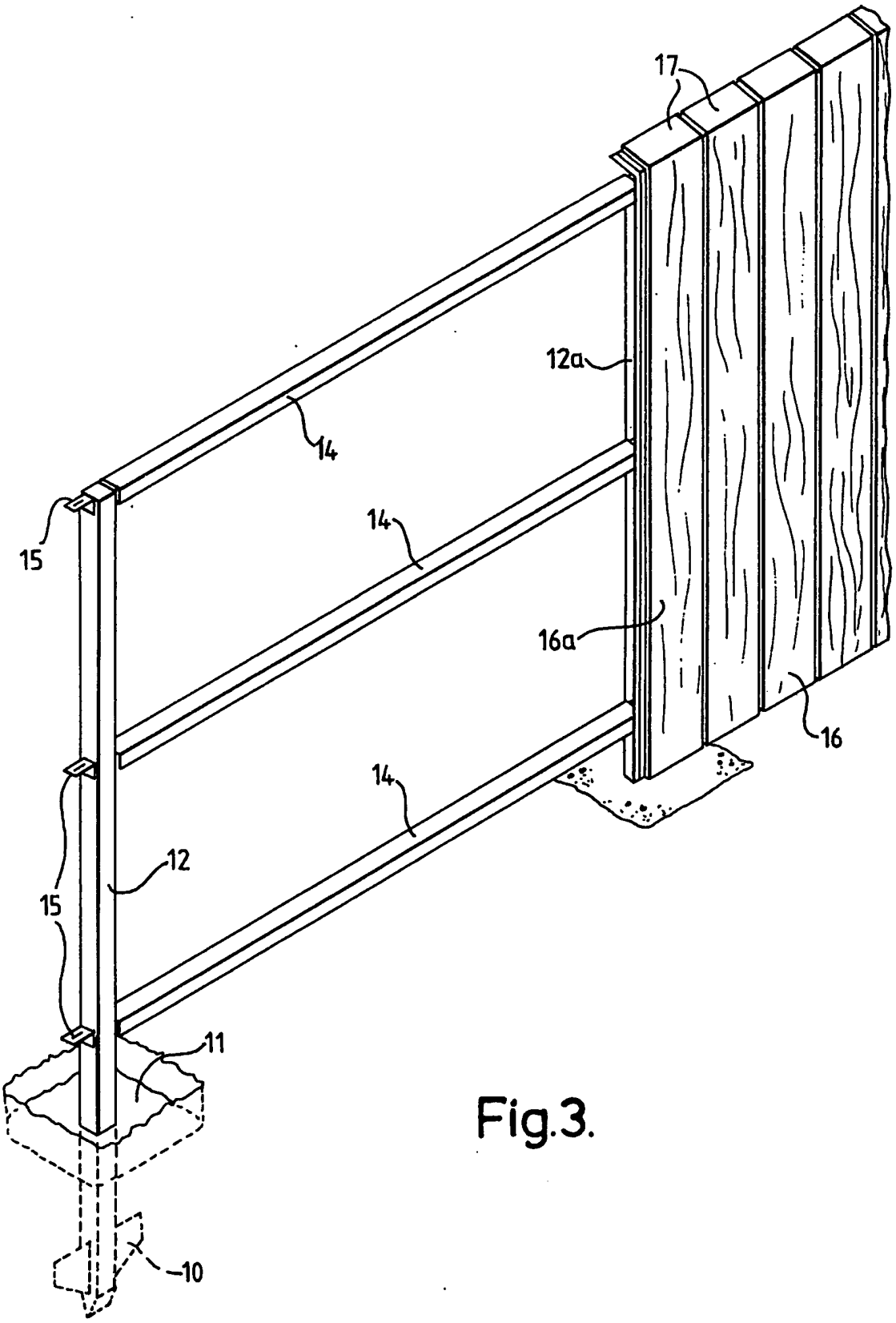


Fig.3.

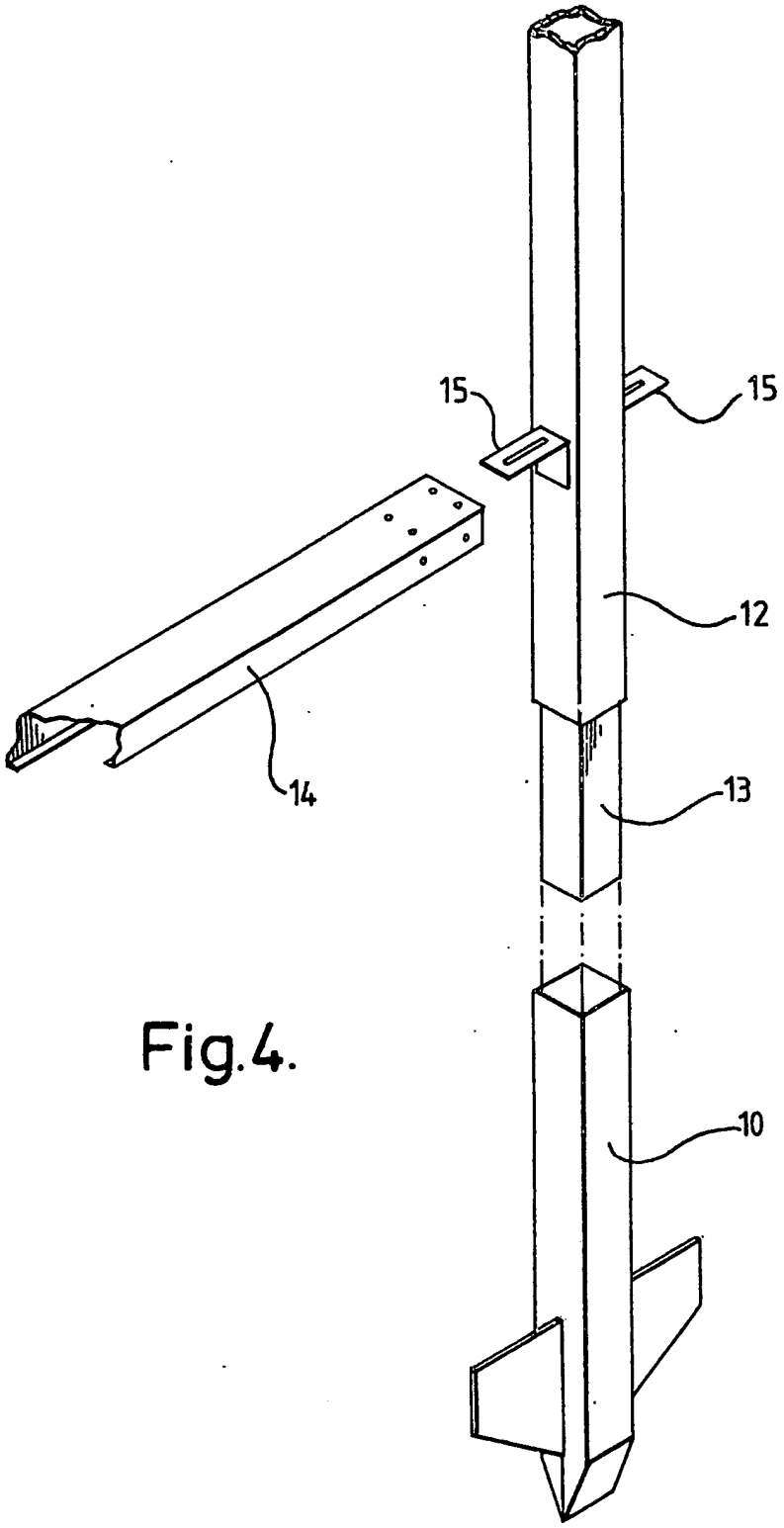


Fig.4.

SPECIFICATION
Fencing system

This invention relates to a fencing system.

This system has been developed initially to meet a need as a replacement for conventional noise barrier fences used between housing areas and motorways or other heavily used roadways. These barrier fences are generally made up from concrete uprights with concrete or wooden cross members faced on both sides with wooden planks or panels. It would be advantageous to replace the wooden planks or panels by concrete for weather resistance and strength but this would prove expensive with conventional concrete panels which are also very heavy to handle.

The concrete uprights are supported in bases made by pouring wet concrete into excavated holes into which are set the uprights. Large quantities of concrete are required and also access for bulky equipment to excavate the holes and pour the concrete.

We have developed a fencing system to overcome drawbacks of the above described noise barriers, but the various components of the system are also applicable to fencing systems in general.

According to one aspect of the invention there is provided a fence structure comprising two or more upright fence posts, two or more horizontal members extending between each pair of adjacent fence posts, and a plurality of vertical cladding members attached to the horizontal members, the vertical edges of adjacent vertical cladding members overlapping or interlocking with each other, the width of the vertical cladding members being greater than the width of the fence posts so that the cladding members may be fixed to the horizontal members while bridging across the fence posts to provide an unbroken sequence of cladding members along the fence line.

For combined lightness of weight, strength and durability the cladding members are preferably formed from glass reinforced cement. Other suitable materials are steel, glass reinforced plastic and wood. The fence posts are typically of concrete or steel. Glass reinforced plastic, glass reinforced cement or wood may also be used. The horizontal members are preferably of steel so that the cladding members can be easily attached, for example by punching or drilling holes through the cladding members and bolting into the underlying horizontal members. The overlapping or interlocking cladding members may be slid vertically relative to each other before fixing to accommodate a varying contour line between the fence posts.

To avoid extensive excavations the fence posts are preferably mounted in pre-formed sockets rammed into the ground.

According to another aspect of the present invention there is provided a support socket for a fence post comprising a tubular member tapered at one end and having a pair of fins extending from opposed sides.

The support socket may be forced into unprepared ground avoiding extensive excavation and use of large quantities of wet concrete, although when a fence post has been set in the support socket it is advisable that a collar of concrete is set around the post/socket at ground level. The socket is positioned in the ground so that the fins will be parallel to the finished fence line, thus providing additional stability against wind forces. The tubular member may be of circular, square or other transverse cross section to match the fence post. The tapered end may be formed by cutting and folding one end of the tubular member or by simply flattening one end of the tubular member.

We have also found that the socket may be forced into the ground using a hydraulic or pneumatic hammer powered by a small portable pump or compressor which can easily be manhandled to difficultly accessible sites.

According to another aspect of the invention there is provided a coupling tool for coupling the above described socket support to a hydraulic or pneumatic hammer comprising a pad for engaging the open end of the socket, on one side of the pad a plug, for insertion in the open end of the socket, and/or a skirt for surrounding the open end of the socket, and on the other side of the pad a spigot for engagement with the chuck of a hydraulic or pneumatic hammer.

According to another aspect of the present invention there is provided a method of erecting a fence post comprising positioning a support socket as described above vertically with the tapered end against a ground surface, engaging a coupling tool as described above with the chuck of a hydraulic or pneumatic hammer, placing the coupling tool on the open end of the tubular member of the support socket operating the hammer to force the socket into the ground, removing the coupling tool from the support socket and sliding a fence post into the socket.

The fence post is preferably a close sliding fit in the socket. When a concrete fence post is used a steel spigot is preferably moulded into the end of the post for insertion into the socket.

The ground surface against which the socket is placed is preferably formed by excavating slightly below natural ground level so that after insertion of the fence post a concrete collar can be cast around the fence post, the collar being finished flush with the natural ground surface.

When the socket is driven into an excavated depression in the ground surface it can be difficult to assess whether or not a socket for an adjacent fence post has been driven to the correct level relative to the preceding socket.

According to another aspect of the invention there is provided a levelling tool comprising a member having a first abutment surface for supporting a levelling bar, a second abutment surface for engaging the top of a support socket, and having a spigot to locate the member on the support socket.

To assess the relative depths of a pair of

adjacent support sockets, a levelling tool is placed in the top of each socket with the second abutment surface resting against the top of the socket. A levelling bar is then laid between the levelling tools in contact with the first abutment surfaces, and the inclination of the levelling bar may be checked e.g. with a spirit level. One support socket may then be driven deeper until further testing with the levelling bar indicates the desired depth has been achieved, which may be when the bar is horizontal or at a chosen inclination to the horizontal.

In the preferred form of the present invention the various aspects of the invention given above are used in combination, although each aspect may be usefully used individually in other fencing systems.

When a fencing system of this invention is clad on one side with glass reinforced cement on other material panels it may be clad on the other side with wood to give the same appearance as conventional noise barriers. In such a situation the glass reinforced cement panels are preferably moulded with a horizontal lip at their upper ends, the lip being positioned so as to bridge the gap between the vertical panels on each side of the fence structure and provide a weather shield over the gap. Even if the fence is clad on one side only with glass reinforced cement panels, the provision of the integral lip improves the appearance of the fence.

By way of example only, a preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

Fig. 1 shows in front and side elevation a support socket for a fence post.

Fig. 2 is a vertical section through a coupling tool.

Fig. 3 is an isometric view of a partially assembled fence structure.

Fig. 4 is a fragmentary isometric view of a support socket and associated fence post and horizontal members prior to assembly.

Fig. 5 and 5a are perspective and end views respectively of a levelling tool.

Referring to Fig. 1, a support socket for a fence post is made up from a tubular member 1 formed from a hollow steel tube of square cross-section. The tube 1 has a closed, tapered end 2 formed by cutting and folding the previously open end of the tube. The other end 3 of the tube 1 remains open. Welded to opposed sides of the tube 1 are a pair of steel fins 4 whose leading edges are tapered towards the tapered tube end 2.

The support socket is coupled to a hydraulic hammer by a coupling tool shown in Fig. 2. This tool has a pad 5 which is placed against the walls of the open tube end 3 and a spigot 6 which is engaged with the chuck of a hydraulic hammer. To locate the tool on the socket, the pad 5 is provided with a skirt 7 which surrounds the outside of the open end 3, and a plug 8 which fits inside the open end 3. Location could be provided by either skirt 7 or plug 8 individually but the combination shown is preferred. To further assist in location the annular space 9 between the skirt 7 and plug 8 is tapered outwardly.

Fig. 3 shows at 10 a support socket which has been rammed into the ground using a hydraulic hammer and a coupling tool as shown in Fig. 2. Prior to ramming, the ground has been excavated at 11 to about 150 mm deep. Into the socket 10 is inserted a fence post 12 based on steel tube of the same cross section as the socket. The lower end of the post 12 contains a spigot 13 (see Fig. 4) of square section steel tube which is a close fit in the tube of both post 12 and socket 10 and is welded into post 12. The use of internal spigot 13 provides a shoulder between post 12 and the spigot which prevents over or under-insertion of the post 12 into the socket 10. After insertion of the spigot 13 into the socket 10, a concrete collar is cast into the excavation 11 around the post 12.

Horizontal rails 14 are fixed between adjacent pairs of posts 12 by bolting the rails 14 to brackets 15 bolted to the posts 12. The rails 14 are formed from steel channel.

Cladding panels 16 formed from glass reinforced cement are secured to the horizontal rails 14. Bolt holes may be punched or drilled on site so that the panels are can be positioned to suit local conditions. The vertical edges of the panels 16 overlap to give a complete barrier along the fence line. The panels 16 may be adjusted vertically relative to each other before securing to follow the ground contour between posts 12.

Differences in base levels of the fence posts may also be accommodated to a reasonable extent by the tolerances in the bolted connections between the horizontal rails 14 and brackets 15. These tolerances allow the rails 15 to adopt a non-horizontal position so that the fencing system can be used on inclined ground as well as ground having a varying contour between fence posts.

The width of the panels 16 relative to the width of posts 12 allow the panels to be attached across the post 12 without a break as shown for panel 16a. At the upper end of each panel 16 is formed a lip 17 which hides the upper rail 14 and provides a weather shield to the interior of the fence structure when the structure is also clad on its other side.

The lip 17 also gives an impression of solid depth to a wall which to the uninformed eye may appear insubstantial because of cladding panel construction.

In practice, before the post 12 is inserted in the socket, the depth to which the socket 10 is driven into the ground relative to the preceding socket is checked using a pair of levelling tools as shown in Fig. 5. The tool has a body 18, conveniently cut from steel tube of the same section as the post 12, and a spigot 19 protruding from the body 18. The spigot 19 is of smaller cross-section than the spigot 13 so that it may readily be located in and removed from a socket 10, using handle 20 welded to the body 18.

The shoulder 21 between the spigot 19 and body 18 forms an abutment which rests against

the top of a socket 10. The length of the body 18 is sufficient for top 22 of the body to stand above the natural ground surface when a socket 10 is in an excavation 11. A pair of levelling tools of identical dimensions are located in adjacent sockets 10 and the top surfaces 22 are used as abutments on which to rest a levelling bar spanning between the two levelling tools. After checking the level of the levelling bar one of the sockets may be driven deeper until further testing shows the bar to be horizontal or at a desired inclination.

In a pair of levelling tools, the handles 20 are preferably positioned in mirror image positions as shown in Fig. 5(a) so that both tools can be carried in one hand.

CLAIMS

1. A support socket for a fence post comprising a tubular member tapered at one end and having a pair of fins extending from opposed sides.

2. A support socket according to claim 1 in which the tapered end has been produced by flattening one end of the tubular member.

3. A support socket according to claim 1 in which the tapered end has been produced by cutting and folding one end of the tubular member.

4. A fence structure comprising two or more upright fence posts, each supported in a support socket according to claim 1, two or more horizontal members extending between each pair of adjacent fence posts, and a plurality of vertical cladding members attached to the horizontal members, the vertical edges of adjacent cladding members over lapping or interlocking with each other, the width of the vertical cladding members being sufficiently greater than the width of the fence posts that the cladding members may be fixed to the horizontal members while bridging across the fence post to provide an unbroken sequence of cladding members along the fence line.

5. A fence structure according to claim 4 in which the vertical cladding members are made of glass reinforced cement.

6. A fence structure according to claim 4 comprising vertical cladding members of glass reinforced cement on one side of the fence and vertical cladding members of the same or another material on the other side of the fence, the members on the one side having a horizontal lip formed integrally at their upper ends, the lips bridging the gap between the cladding members on the opposite sides of the fence.

7. A method of erecting a fence post comprising positioning a support socket according to claim 1 vertically with the tapered end against a ground surface, forcing the socket into the ground using a hydraulic or pneumatic hammer, and sliding a fence post into the socket.

8. A method according to claim 7 in which the hydraulic or pneumatic hammer is engaged with the support socket via a coupling tool comprising a pad for engaging the open end of the socket, the pad having on one side a plug for insertion in the open end of the socket, and/or a skirt for surrounding the open end of the socket, the pad having on the other side a spigot for engagement with the chuck of the hydraulic or pneumatic hammer.

9. A method according to claim 7 or 8 in which the ground surface against which the socket is placed is formed by excavating slightly below natural ground level, and after insertion of the fence post a concrete collar is cast around the fence post, the collar being finished flush with the natural ground surface.

10. A method according to claim 9 in which prior to insertion of the fence posts the relative depths of a pair of adjacent support sockets are checked by placing a levelling tool, comprising a member having a first abutment surface for supporting a levelling bar, a second abutment surface for engaging the top of a support socket, and having a spigot to locate the member on the support socket, in the top of each socket with the second abutment surface resting against the top of the socket, and laying a levelling bar between the levelling tools in contact with the first abutment surfaces.

11. A support socket according to claim 1 substantially as described herein with reference to Fig. 1, of the accompanying drawings.

12. A fence structure according to claim 4 substantially as described herein with reference to Fig. 3 and 4 of the accompanying drawings.

13. A method according to claim 7 substantially as described herein with reference to any one of Figs. 1 to 5 of the accompanying drawings.

14. A coupling tool for engaging a hydraulic or pneumatic hammer with a support socket according to claim 1, the coupling tool comprising a pad for engaging the open end of the socket, the pad having on one side a plug for insertion in the open end of the socket, and/or a skirt for surrounding the open end of the socket, the pad having on the other side a spigot for engagement with the chuck of the hydraulic or pneumatic hammer.

15. A coupling tool according to claim 14 substantially as described herein with reference to Fig. 2 of the accompanying drawings.

16. A levelling tool for use with a support socket according to claim 1, the levelling tool comprising a member having a first abutment surface for supporting a levelling bar, a second abutment surface for engaging the top of the support socket, and having a spigot to locate the member on the support socket.

17. A levelling tool according to claim 16 substantially as described herein with reference to Fig. 5 or Fig. 5(a) of the accompanying drawings.

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